Int J Leg Med (1994) 107:162–163

LETTER TO THE EDITOR

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Sir, Wall et al. (1993) investigated the allele frequencies of polymorphic short tandem repeat (STR) loci in a number of different populations. The loci were amplified by PCR and the products were separated using native polyacrylamide gel electrophoresis. After visualisation by ethidium bromide staining, the bands were sized by reference to marker lanes containing an Msp 1 digest of pBR322.

Wall et al. (1993) reported considerable variation in both the alleles present at the F13A1 locus and their relative frequencies between four populations – Gujarati, Pakistani, Greek Cypriot and Northern European.

The authors therefore proposed that the use of the F13A1 locus for forensic identity testing would necessitate the construction of databases from many subpopulations prior to estimating the rarity of a profile.

We have investigated allele distributions in the same four populations using fluorescently labelled PCR primers and an automated DNA sequencer (ABI 373A with Genescan 672 software). The DNA fragments were separated using denaturing polyacrylamide gel electrophoresis (24 cm well-to-read) and sized automatically by reference to an internal size marker (GS2500, ABI) (Mayrand et al. 1992). This method enables fragments to be sized with an accuracy of approximately one base pair. Our reproducibility studies, involving the electrophoresis of 360 F13A1 allelic ladder samples, give a coefficient of variation (relative standard deviation) of 0.17% for this system.

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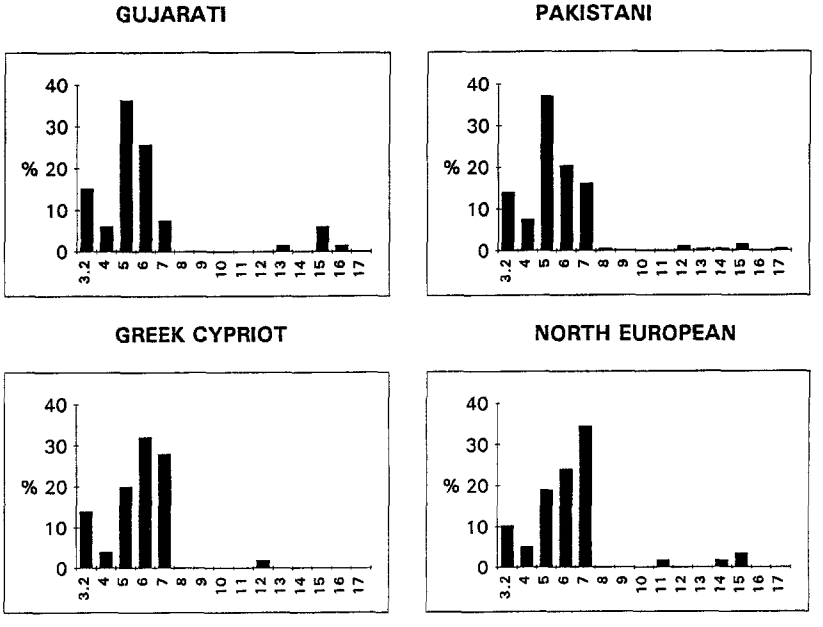

Fig. 1 Histograms showing the distribution of alleles at the F13A1 locus in four populations. Gujarati population – 33 individuals*, Pakistani population – 93 individuals, Greek Cypriot population – 25 individuals*, North European population – 29 individuals**. * Samples previously analysed by Wall et al.; ** Samples not analysed by Wall et al. but taken from the same population survey.

The allele distributions we obtained from the four populations using this method are shown in Fig. 1.

Discussion

The results shown here differ markedly from those of Wall et al. (1993). They are, however, in agreement with the findings of Gill and Evett (1994) and Hammond et al. (1994).

We believe that our use of a precise method for sizing DNA fragments has highlighted inaccuracies in the results published by Wall et al. (1993). The use of non-automated, native polyacrylamide gels, without internal lane size markers appears to be an unsuitable method for the analysis of the F13A1 locus. This has been confirmed by the findings of Kimpton et al. (1994).

We therefore believe that the conclusions presented in Wall et al. (1993) with respect to the F13A1 locus are incorrect. Whilst there are significant differences in the F13A1 allele frequencies between the major ethnic groups, (North European and Asian), the differences between populations within these groups are not significant (Fig. 2).

	Cypriot	Gujarati	Pakistani
North Euro	0.11 not sig	0.25 sig 5%	0.24 sig 5%
Cypriot		0.2 not sig	0.21 not sig
Gujarati			0.06 not sig

Fig. 2 Results of an intercomparison of all four populations at the F13A1 locus using the Kolmogorov-Smirnov two sample test as described in Campbell RC (1989). Diagonal bars represent comparisons where the two populations are significantly different from each other

References

Campbell RC (1989) Statistics for biologists, 3rd edn. Cambridge University Press, UK

Gill P, Evett I (1994) Population genetics of short tandem repeat (STR) loci. Genetica (in press)

Hammond HA, Jin L, Zhong Y, Caskey CT, Chakraborty R (1994) Evaluation of 13 short tandem repeat loci for use in personal identification applications. Am J Hum Genet 55:175–189

Kimpton C, et al (1994) – Report on the second EDNAP collaborative STR exercise. Forensic Sci Int (submitted)

Mayrand PE, Corcoran KP, Ziegle JZ, Robertson JM, Hoff JB, Kronick MN (1992) The use of fluorescence detection and internal lane standards to size PCR products automatically. Appl Theor Electrophoresis 3:1–11

Wall WJ, Williamson R, Petrou M, Papioannou D, Parkin BH (1993) Variation of short tandem repeats within and between populations. Hum Mol Genet 2:1023–1029